



Attorney Docket No.: 979-042

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re application of

Pinto

Examiner: Jill M. Gray

Serial No: 10/719,698

Art unit: 1774

Filed: November 21, 2003

For: FLAME RETARDANT CABLE

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**APPEAL BRIEF**

**Mail Stop Appeal Brief-Patents**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Dear Sirs:

In response to Notice of Appeal entered on November 16, 2007, please enter the following Appeal Brief to be submitted to the Patent Board of Appeals and Interferences. A Petition for a two month extension of time is enclosed.

Application No. 10/719,698  
Appeal Brief Dated March 17, 2008  
In Reply to Notice of Appeal Dated November 16, 2007

**Real Party in Interest (37 CFR 41.37(c)(1)(i))**

The real party in interest is Nexans a French Corporation having an address of 16  
Rue De Monceau, Paris France 75008. The assignment is recorded at reel/frame  
015237/0459.

Application No. 10/719,698  
Appeal Brief Dated March 17, 2008  
In Reply to Notice of Appeal Dated November 16, 2007

**Related Appeals and Interferences (37 CFR 41.37(c)(1)(ii))**

The Appellant is not aware of any related prior or pending appeals or interferences related to this matter.

**Status of Claims (37 CFR 41.37(c)(1)(iii))**

Claims 1-20, of which claim 1 is the sole independent claim, are pending and are the claims on appeal.

Claims 1-20 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

Claims 1-5, 7-8, 10-11 16-17 and 20 are rejected under either 35 U.S.C. §§ 102(e) or 103(a) as being anticipated by or obvious over Murphy et al. (U.S. Patent Application No. 2003/0133679).

Claims 1-8 are rejected under 35 U.S.C. §§ 102(e) 103(a) as being anticipated by or obvious over Sakurai (U.S. Patent No. 6,770,820)

Claims 1-20 are rejected under 35 U.S.C. § 103(a) as being obvious over Hasegawa et al. (U.S. Patent No. 6,755,995) in view of Hall (U.S. Patent No. 6,025,422), further in view of Ogawa et al. (U.S. Patent No. 4,417,018).

**Status of Amendments (37 CFR 41.37(c)(1)(iv))**

A First Office Action was issued on March 24, 2005 to which a responsive Amendment was filed on June 27, 2005. A Final Office Action was issued on September 9, 2005. An Amendment after final and an RCE were filed on January 13, 2006.

A new non-final Office Action was issued on February 27, 2006 to which an Amendment was filed in response on June 15, 2006. A second final Office Action was issued on September 8, 2006. A Responsive Request for Reconsideration was filed after final on February 12, 2007.

In response, the Examiner removed the Final status of the Office Action and issued another non-final Office Action dated March 14, 2007 to which a responsive amendment was filed on June 1, 2007.

The Examiner issued a third final Office Action on August 20, 2007 in response to which the present Notice of Appeal was filed on November 16, 2007.

There have been no amendments since the issue of the third final Office Action dated August 20, 2007.

**Summary of Claimed Subject Matter (37 CFR 41.37(c)(1)(v))**

Claim 1 is the sole independent claim on appeal. The following is a summary of the subject matter of independent claim 1 as well as element by element support from the specification. The paragraph notations refer to this application's corresponding U.S. Patent Publication No. 2004/0151906.

1. A flame-retardant cable comprising:
  - a transmission element (see element 2 from figure 1 and paragraph [0060]);
  - a flammable element (see element 3 from figure 1 and paragraph [0060]); and
  - a flame-retardant coating layer of cross-linkable resin surrounding said flammable element (see element 4 from figure 1 and paragraph [0060]), wherein said flame-retardant layer includes a polymer obtained from a polymerizable liquid composition (see paragraph [0008]), and wherein said polymerizable liquid composition contains at least a precursor for said polymer, the precursor including functional groups selected from the group consisting of acrylates, methacrylates, epoxies, vinyl ethers, allyl ethers, and oxetanes (see paragraph [0008]),

wherein said polymerizable liquid composition also includes at least one phosphorous group as an additional precursor (see paragraph [0009]) such that said phosphorus group is chemically bonded to said polymer after polymerization (see paragraph [0011]).

**Grounds of Rejection to be Reviewed on Appeal (37 CFR 41.37(c)(1)(vi))**

Appellant respectfully appeals to the board on the following four grounds:

- 1) That independent claim 1 does not contain new matter as argued by the Examiner on page 2 of the August 20, 2007 Office Action;
- 2) That independent claim 1 is not anticipated by or obvious over the Murphy reference (U.S. Patent Publication No. 2003/0133679) as argued by the Examiner on page 3 of the August 20, 2007 Office Action;
- 3) That independent claim 1 is not anticipated by or obvious over the Sakurai reference (U.S. Patent No. 6,770,820) as argued by the Examiner on page 5 of the August 20, 2007 Office Action; and
- 4) That independent claim 1 is not obvious over the combination of the Hasegawa (U.S. Patent No. 6,755,995), Hall (U.S. Patent No. 6,025,422), and Ogawa (U.S. Patent No. 4,417,018) references as argued by the Examiner on page 6 of the August 20, 2007 Office Action.

**Argument (37 CFR 41.37(c)(1)(vii))**

Ground 1 - 35 U.S.C. § 112

Regarding the rejection of independent claim 1 under 35 U.S.C. § 112 the examiner has rejected this claim under paragraph 1 contending that the element "...includes at least one phosphorus group as an additional precursor..." is new matter. Specifically, the Examiner contends that this element, as amended in the June 1, 2007 Amendment, is not supported by the specification as filed because the specification only discloses a single precursor, that contains phosphorus groups and does not disclose an additional precursor that contains a phosphorus group. See pages 2-3 of the August 20, 2007 Office Action.

Appellant respectfully disagrees for the following reasons.

Appellant begins by noting that the specification as filed does support the language as claimed independent claim 1. For example, the Examiner is contending that the specification only supports one precursor that includes phosphorus. However, paragraphs [0008] - [0011] state:

"[0008] To this end, the invention provides a flame-retardant cable comprising a transmission element, a flammable element, and a flame-retardant coating layer surrounding said flammable element, and made of a material based on a polymer obtained from a polymerizable liquid



composition containing at least a precursor for said polymer including functional groups selected from acrylates, methacrylates, epoxies, vinyl ethers, allyl ethers, and oxetanes,

[0009] wherein said material includes at least one phosphorous group.

[0010] The phosphorous group(s) provide the flame-retardant properties of the coating of the invention.

[0011] In a preferred embodiment, the phosphorous group may be chemically bonded to said polymer, and in this embodiment, the precursor of said polymer may include at least one phosphorous group."

Paragraph [0009] then notes that the material (or polymerizable liquid composition) includes a phosphorus group, which as noted in paragraph [0010] is added to the polymerizable liquid composition for fire retardant properties. This phosphorus group is in addition to the precursors listed at the end of the previous paragraph [0008]. Thus, although the exact term "addition" is not present in paragraph [0009], one of ordinary skill in the art would recognize that the invention includes a polymerizable liquid composition that includes a precursor for forming a polymer, such as those items from the list acrylates, methacrylates, epoxies, vinyl ethers, allyl ethers, and oxetanes and that a phosphorus group is added prior to polymerization. As such, the phosphorus group is an added precursor that is ultimately incorporated into the formed polymer.

Independent claim 1, among other elements includes a polymerizable liquid composition, that contains at least a precursor for said polymer, the precursor including functional groups selected from the group consisting of acrylates, methacrylates, epoxies, vinyl ethers, allyl ethers, and oxetanes. Claim 1 also includes the elements:

"...wherein said polymerizable liquid composition also includes at least one phosphorous group as an additional precursor such that said phosphorus group is chemically bonded to said polymer after polymerization."

Appellant respectfully submits that one of ordinary skill in the art would readily recognize that the specification identifies a first list of possible precursor items for the polymerizable liquid composition and a second "additional precursor" of a phosphorus group, its inclusion for fire retardant properties. Appellant therefore requests that Board of Patent Appeals and Interferences remove the Examiner's rejection under 35 U.S.C. § 112.

Furthermore, even if disclosure does not precisely disclose the element that the at least one phosphorous group is an additional precursor, Appellant notes that the disclosure does not need to have word-for-word support in order to meet the requirements of the first paragraph of 35 U.S.C. § 112. Rather under 35 U.S.C. § 112 paragraph 1, to satisfy the written description requirement, the application needs to convey with reasonable clarity to those skilled in the art that, as of the filing date, that the Applicant was in possession of the invention, and that the invention, in that context, is whatever is now claimed. Thus, the test for sufficiency of support in a patent application is not exact wording, but instead is whether the disclosure of the application relied upon "reasonably conveys to the artisan that the inventor had possession at that time of the later claimed subject matter." See MPEP § 2163.02 and *Ralston Purina Co. v. Far-Mar-Co., Inc.*, 772 F.2d 1570, 1575, 227 USPQ 177, 179 (Fed. Cir. 1985) (quoting *In re Kaslow*, 707 F.2d

1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983)).

Regardless of the decision by the Board of Patent Appeals and Interferences regarding this new matter issue, Appellants respectfully submit that the amendment was only to clarify the claim language. The subsequent arguments regarding the differences between the present invention as claimed in independent claim 1 versus the prior art cited by the Examiner are not affected by the outcome of the decision on this rejection under 35 U.S.C. § 112 and thus Appellants request that the following arguments be addressed independently.

Grounds 2-4 -35 U.S.C. §§ 102 and 103

Regarding the second through fourth issues on appeal, Appellants begin by noting that the use of phosphorus as a blend or mixture in a polymer to achieve some measure of fire retardance is known in the prior art.

However, independent claim 1 includes the feature that the polymerizable liquid composition also includes at least one phosphorous group such that the phosphorus group is chemically bonded to the polymer after polymerization. As noted in the several amendments such a feature is not shown in the prior art.

As described previously this arrangement as claimed in claim is an advantage over prior art arrangements. The inclusion of the phosphorus group in the polymerizable

liquid composition allows the phosphorus to be incorporated as a functional group of the polymer. This provides added stability to the phosphorus in the flame retardant material.

An Affidavit under 37 CFR 1.132, signed by the inventor Mr. Pinto, was submitted with the February 12, 2007 Amendment. In this declaration, Mr. Pinto confirms the ordinary understanding of the element within claim 1, namely "...that said phosphorus group is *chemically bonded* to said polymer..."

For example, paragraphs 9 -11 of the Pinto Declaration recite -

9) The recitation of the first element being chemically bonded to a second element has a specific meaning in the field of polymer composition, namely that the phosphorus group is chemically bonded to the polymer by some form of covalent bond.

10) Based on my understating of chemical engineering, and in particular polymer compositions, two combined elements that include a bonded structure require certain parameters in order to formulate such a bond.

11) For example, in the present situation the phosphorus group is a group chemically bonded to the larger polymer structure. As in all chemical reactions resulting in covalent bonding, such bonding is a result of a set of minimum formulation parameters including at least certain concentrations of reactants, as well as time and heat of reaction, all of which are necessary to form the chemical bond. This bonding would be considered inherent in a situation where a first group (phosphorus group) is a "function group) of a second element (the polymer). See Example 2.

As such, in each of the Examiner's current prior art rejections, the Examiner has cited to references that do not show a phosphorus group chemically

bonded to the polymer, but rather that show some form of phosphorus that is simply blended with the polymer.

Regarding the second issue on appeal, namely the rejection in view of Murphy, this reference shows the use of a phosphorus group blended into the coating material. However, in the relevant paragraphs [0049] - [0053] Murphy does not show that that phosphorus is chemically bonded to the polymer after polymerization.

For example, paragraph [0050] of Murphy states that the phosphorus containing items are "suitable flame-retardant plasticizers." Plasticizers are additives that increase the plasticity or fluidity of the material to which they are added. There is nothing in Murphy that suggests the chemical bonding of the phosphorus to the polymer. Rather it appears that Murphy applies the phosphorus to the compound by simple addition (blending) similar to the other prior art references cited by the Examiner.

Regarding the third issue on appeal, namely the rejection in view of Sakurai, this reference shows the addition of a phosphorus group into the coating material. However, as noted in the prior amendments, Sakurai does not show that the phosphorus is chemically bonded to the polymer after polymerization.

For example, Sakurai teaches a shielded flat cable whereby

“it is preferred to *blend* a phosphoric acid methacrylate and meamine-based resin (to be referred to as “base resin” hereinafter) which is the main component of the above adhesive so as to improve adhesion.” (See column 5, lines 19-23 of Sakuari). (emphasis added)

Furthermore, as noted in column 8, lines 16-19 Sakuari states,

“When the above base resin *is mixed* with a phosphoric acid methacrylate and melamine-based resin, it can further improve adhesion between a resin such as polyimide or polyethylene terephthalate and a metal film.” (emphasis added)

It is clear from this description, that the phosphorus taught in Sakuari, similar to the previously cited prior art, is simply blended into an existing polymer. Nothing in Sakuari suggests that phosphorus is chemically bonded to the polymer after polymerization. Moreover, there is no teaching or suggestion in Sakuari that includes the phosphorus as a precursor for incorporation (via polymerization) into the polymer. Rather Sakuari relates to an additive that is blended to an existing polymer.

As such, the Sakuari reference does not teach or suggest that the phosphorus group is chemically bonded to the polymer after polymerization.

Regarding the fourth issue on appeal, namely the rejection in view of Hasegawa, Hall and Ogawa, these references (particularly the primary Ogawa reference) show the addition of a phosphorus group into the coating material.

However, as noted in the prior amendments, the Ogawa reference that is relied on by the Examiner with respect to the addition of phosphorus, does not show that that phosphorus is chemically bonded to the polymer.

For example, column 9, lines 34-38 of Ogawa state:

“To improve other properties, furthermore, the flame retardant resin composition of the present invention can be *blended with* a variety of additives.” (emphasis added)

Furthermore the related lines 52-55 of column 9 state:

“In addition to organic halogen compounds, it is also allowable to *add* phosphorous compounds such as red phosphorus and amide phosphonate which serves as a flame retardant.” (emphasis added)

From this language, and the related language in columns 9 and 10, it is clear that the phosphorus compound being added as an additive is simply being placed in the polymer as a mixture component not for the purposes of being chemically bonded to the polymer after polymerization. This is evident as there is no bonding suggested, nor is their any parameters provided to suggest chemical bonding such as the concentrations required, catalysts for bonding, heat necessary for the reaction etc...

As such, the Ogawa reference, even if combined with Hall and Hasegawa, does not teach or suggest that the phosphorus group is chemically bonded to the polymer after ploymerization.

For at least the above reasons, Appellant respectfully submits that the cited prior art does not teach or suggest all of the elements of independent claim 1 and respectfully request that the Board of Patent Appeals and Interferences reverse the Examiner's prior art rejections.



**Claims Appendix (37 CFR 41.37(c)(1)(viii))**

The following is a listing of claims 1-20 in their current condition for appeal, inclusive of all prior amendments.

1. A flame-retardant cable comprising:  
  
a transmission element;  
  
a flammable element; and  
  
a flame-retardant coating layer of cross-linkable resin surrounding said flammable element, wherein said flame-retardant layer includes a polymer obtained from a polymerizable liquid composition, and wherein said polymerizable liquid composition contains at least a precursor for said polymer, the precursor including functional groups selected from the group consisting of acrylates, methacrylates, epoxies, vinyl ethers, allyl ethers, and oxetanes,  
  
wherein said polymerizable liquid composition also includes at least one phosphorous group as an additional precursor such that said phosphorus group is chemically bonded to said polymer after polymerization.
2. A flame-retardant cable according to claim 1, wherein said phosphorous group is chemically bonded to said polymer.
3. A flame-retardant cable according to claim 1, wherein the precursor of said polymer includes at least one phosphorous group.

4. A flame-retardant cable according to claim 1, wherein said material is halogen-free.

5. A flame-retardant cable according to claim 1, wherein said flammable element is selected from the group consisting of the following elements: an insulating layer; a sheathing layer; a reinforcing element; an optical fiber protection; a padding element; a groove core; a tape; and a braid.

6. A flame-retardant cable according to claim 1, wherein, when said flammable element is an insulating layer, said insulating layer is made from a material selected from a halogen-free thermoplastic polymer.

7. A flame-retardant cable according to claim 1, wherein the transmission element is selected from a conductor of light and a conductor of electricity.

8. A flame-retardant cable according to claim 1, wherein said flame-retardant coating layer is made by applying said polymerizable liquid composition on said flammable element using a coating technique selected from the group consisting of spraying, dipping, impregnation, and application by means of a brush.

9. A flame-retardant cable according to claim 1, wherein said flame-retardant coating layer is made from a tape impregnated in said polymerizable liquid composition

and wound on said flammable element.

10. A flame-retardant cable according to claim 1, wherein said polymerizable liquid composition contains a reactive diluent including an antiabrasion compound containing at least one functional group that is selectively reactive with one of the functional groups of said polymer precursor.

11. A flame-retardant cable according to claim 10, wherein the number of parts by weight of said antiabrasion compound relative to 100 parts by weight of said liquid composition is less than 95.

12. A flame-retardant cable according to claim 10, wherein, when said antiabrasion compound contains at least one acrylate functional group, the acrylate equivalent weight of said antiabrasion compound is greater than 80.

13. A flame-retardant cable according to claim 1, wherein the liquid composition is polymerizable by actinic radiation, and when said actinic radiation is of the UV type, the composition includes a photoinitiator.

14. A flame-retardant cable according to claim 13, wherein the number of parts by weight of said photoinitiator relative to 100 parts by weight of said composition lies in the range 0.1 to 10.

15. A flame-retardant cable according to claim 1, wherein the liquid composition is polymerizable by UV radiation and contains:

- 80 parts by weight of said polymer precursor, said precursor being a halogen-free oligomer;
- 17 parts by weight of an isobornyl acrylate; and
- 3 parts by weight of a photoinitiator.

16. A flame-retardant cable according to claim 11, wherein the number of parts by weight of said antiabrasion compound relative to 100 parts by weight of said liquid composition is in the range 10 to 30.

17. A flame-retardant cable according to claim 12, wherein, when said antiabrasion compound contains at least one acrylate functional group, the acrylate equivalent weight of said antiabrasion compound is about 210.

18. A flame-retardant cable according to claim 14, wherein the number of parts by weight of said photoinitiator relative to 100 parts by weight of said composition is about 3.

19. A flame-retardant cable according to claim 6, wherein said insulating layer is made from polyethylene.

20. A flame-retardant cable according to claim 10, wherein said antiabrasion

Application No. 10/719,698  
Appeal Brief Dated March 17, 2008  
In Reply to Notice of Appeal Dated November 16, 2007

compound is of a bicyclic structure

Application No. 10/719,698  
Appeal Brief Dated March 17, 2008  
In Reply to Notice of Appeal Dated November 16, 2007

**Evidence Appendix (37 CFR 41.37(c)(1)(ix))**

There is no additional material for this section.

Application No. 10/719,698  
Appeal Brief Dated March 17, 2008  
In Reply to Notice of Appeal Dated November 16, 2007

**Related Proceedings Appendix (37 CFR 41.37(c)(1)(x))**

There is no additional material for this section

Application No. 10/719,698  
Appeal Brief Dated March 17, 2008  
In Reply to Notice of Appeal Dated November 16, 2007

In view of the foregoing, Appellant respectfully submits that the present invention as claimed in claims 1-20 are now in condition for allowance, and requests that the Patent Board of Appeals reverses the rejections of the Examiner and remands it to him for further prosecution as requested by Appellant.

Respectfully submitted

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Dated: 3/17/08

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